

**Table C-1. Table of Transmitting Frequencies in the VHF Maritime Mobile**

Channel Number	Note	Transmitting Frequencies (MHz)		Channel Use			
		Ship Stations	Coastal Stations	Intership	Port Operations and Ship Movement		Public Correspondence
					Single Frequency	Two Frequency	
85	m, o	157.275	161.875		x	x	x
26	m, o	157.300	161.900			x	x
86	m, o	157.325	161.925		x	x	x
27		157.350	161.950			x	x
87		<b>157.375</b>			x		
28		157.400	162.000			x	x
88		157.425			x		
AIS 1	I	161.975	161.975				
AIS 2	I	162.025	162.025				

**General Notes for Table C-1**

- a. Administrations may designate frequencies in the intership, port operations, and ship movement services for use by light aircraft and helicopters to communicate with ships or participating coast stations in predominantly maritime support operations under the conditions specified in Nos. **S51.69, S51.73, S51.74, S51.75, S51.76, S51.77** and **S51.78**. However, the use of the channels that are shared with PC shall be subject to prior agreement between administrations that are interested and affected administrations.
- b. The channels of the present Appendix [APP 18] with the exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may also be used for high-speed data and facsimile transmissions, subject to special arrangement between interested and affected administrations.
- c. The channels of the present Appendix [APP 18) but preferably channel 28 and with exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may be used for direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.
- d. The frequencies in this table may also be used for radio communications on inland waterways in accordance with the conditions specified in No. **S5.226**.

- e. Administrations having an urgent need to reduce local congestion may apply 12.5 kHz channel interleaving on a noninterference basis to 25-kHz channels, provided the following conditions are met:
  - 1) Recommendation ITU-R M.1084-2 shall be taken into account when changing to 12.5 kHz channels;
  - 2) This application shall not affect the 25-kHz channels, listed in Appendix **S18**, for maritime mobile distress and safety frequencies, especially the channels 06, 13, 15, 16, 17, and 70, nor the technical characteristics mentioned in Recommendation ITU-R M.489-2 for these channels;
  - 3) Implementation of 12.5 kHz channel interleaving and consequential national requirements shall be subject to prior agreement between the administrations implementing these changes and administrations whose ship station or services may be affected.

#### **Specific Notes for Table C-1**

- f. The frequency 156.300 MHz (channel 06) (see Appendix **S13**, Appendix **S15** and Appendix **S51.79**) may also be used for communication between ship stations and aircraft stations engaged in coordinated search and rescue operations. Ship stations shall avoid harmful interference to such communications on channel 06 as well as communications between aircraft stations, ice-breakers, and assisted ships during ice seasons.
- g. Channels 15 and 17 may also be used for onboard communications, provided the effective radiated power does not exceed 1 W, and subject to the national regulations of the administration concerned when these channels are used in its territorial waters.
- h. Within the European Maritime Area and in Canada, these frequencies (channels 10, 67, 73) may also be used, if required by the individual administrations concerned, for communication between ship stations, aircraft stations, and participating land stations engaged in coordinated search and rescue and anti-pollution operations in local areas, under the conditions specified in Nos. **S51.69**, **S51.73**, **S51.74**, **S51.75**, **S51.76**, **S51.77**, and **S51.78**.
- i. The preferred first three frequencies for the purpose indicated in note *a*. are 156.450 MHz (channel 09), 156.625 MHz (channel 72) and 156.675 MHz (channel 73).
- j. This channel (70) is to be used exclusively for digital selective calling for distress, safety, and calling.
- k. Channel 13 is designated for use on a worldwide basis as a navigation safety communication channel, primarily for intership navigation safety communications. It may also be used for the ship movement and port operations service subject to the national regulations of the administrations concerned.

- l. These channels will be used for an automatic ship identification and surveillance system capable of providing worldwide operation on high seas, unless other frequencies are designated on a regional basis for this purpose.
- m. These channels may be operated as a single frequency channel, subject to special arrangement between interested or affected administrations. (WRC-2000)
- n. The use of these channels should be restricted to navigation-related communications only, and all precautions should be taken to avoid harmful interference to channel 16, e.g., by limiting the output power to 1 W or by geographical separation.
- o. These channels may be used to provide bands for initial testing and possibly, in the future, for introducing new technologies, subject to special arrangement between interested or affected administrations. Stations using these channels or bands for testing or introducing new technologies shall neither cause harmful interference to, nor claim protection from, other stations operating in accordance with Article 5.

## APPENDIX D – INTERFERENCE POWER LEVELS AT THE PC RECEIVER INPUT (VOICE MODE)

The equations used for calculating the  $P_{ino}$  distributions for the various interaction modes are presented in this appendix. Many of the parameters in these equations are stored in the COSAM Equipment Parameter File (EPF).

### Transmitter Adjacent Signal (TAS)

The power spectral density  $S_p$  is obtained from the transmitter power spectral density curve found in the EPF transmitter record. The curve is symmetric about  $\Delta f = 0$ . The TAS calculation should be skipped if the frequencies are cochannel. The mean  $P_{ino}$  for the transmitter adjacent-signal interaction is given by:

$$P_{ino} = S_p (\Delta f) + 10 \log (BW_r) + G_t + G_r - L_s - L_p \quad (D-1)$$

where

$P_{ino}$	=	mean equivalent on-tune interference power level, in dBm
$S_p$	=	mean power spectral density, in dBm/MHz
$\Delta f$	=	$F_r - F_t$ , in MHz
$F_r$	=	tuned frequency of receiver, in MHz
$F_t$	=	tuned frequency of transmitter, in MHz
$BW_r$	=	receiver RF bandwidth, in MHz
$G_t$	=	transmitter antenna gain, in dBi
$G_r$	=	receiver antenna gain, in dBi
$L_s$	=	system losses, in dB
$L_p$	=	mean coupling loss from AIS transmitter antenna to PC receiver antenna, in dB

In these equations, the variable  $L_p$  represents the antenna-to-antenna coupling loss.

The TAS  $P_{ino}$  power levels in the PC receiver 3-dB bandwidth are shown in Table D-1.

**Table D-1. TAS AIS Interference Power Levels at the PC Receiver Input-Voice and Data Modes**

$S_p$ (dBm/MHz)	$10 \log (BW_r)$ (dB)	$G_t$ (dBi)	$G_r$ (dBi)	$L_s$ (dB)	$L_p$ (dB)	Horizontal Antenna Separation (feet)	Delta f (kHz)	$P_{ino}$ (dBm)
-19.81	-18.9	2.1	2.1	1	26.3	10	25	-61.8
-20.81	-18.9	2.1	2.1	1	26.3	10	50	-62.8
-21.81	-18.9	2.1	2.1	1	26.3	10	75	-63.8
-19.81	-18.9	2.1	2.1	1	66.4	1,000	25	-101.9
-20.81	-18.9	2.1	2.1	1	66.4	1,000	50	-102.9
-21.81	-18.9	2.1	2.1	1	66.4	1,000	75	-103.9
-19.81	-18.9	2.1	2.1	1	97.4	10,000	25	-132.9
-20.81	-18.9	2.1	2.1	1	97.4	10,000	50	-133.9
-21.81	-18.9	2.1	2.1	1	97.4	10,000	75	-134.9

**Receiver Adjacent Signal 1 (RAS1)**

The mean receiver rejection (Beff) is obtained from the receiver rejection curve found in the EPF receiver record. The curve is symmetric about delta f = 0. The mean  $P_{ino}$  for the receiver adjacent-signal interaction is given by:

$$P_{ino} = P_t + G_t + G_r - L_s - L_p - \text{Beff}(\Delta f) \quad (\text{D-2})$$

where

$P_{ino}$  = mean equivalent on-tune interference power level, in dBm

$P_t$  = mean peak output power of AIS transmitter, in dBm

Beff (Delta f) = mean rejection of undesired power by PC receiver, in dB

and other terms are as defined previously.

The RAS1  $P_{ino}$  power levels at the PC receiver front end are shown in Table D-2.

**Table D-2. AIS RAS1 Interference Power Levels at the PC Receiver Input-Voice Mode**

<b>P<sub>t</sub></b> <b>(dBm)</b>	<b>G<sub>t</sub></b> <b>(dBi)</b>	<b>G<sub>r</sub></b> <b>(dBi)</b>	<b>L<sub>s</sub></b> <b>(dB)</b>	<b>L<sub>p</sub></b> <b>(dB)</b>	<b>Voice</b> <b>Mode</b> <b>Beff</b> <b>(dB)</b>	<b>Horizontal Antenna</b> <b>Separation</b> <b>(feet)</b>	<b>Delta f</b> <b>(kHz)</b>	<b>P<sub>ino</sub></b> <b>(dBm)</b>
41	2.1	2.1	1	26.3	62	10	25	-44.1
41	2.1	2.1	1	26.3	72	10	50	-54.1
41	2.1	2.1	1	26.3	77	10	75	-59.1
41	2.1	2.1	1	66.4	62	1,000	25	-84.2
41	2.1	2.1	1	66.4	72	1,000	50	-94.2
41	2.1	2.1	1	66.4	77	1,000	75	-99.2
41	2.1	2.1	1	97.4	62	10,000	25	-115.2
41	2.1	2.1	1	97.4	72	10,000	50	-125.2
41	2.1	2.1	1	97.4	77	10,000	75	-130.2

## APPENDIX E – INTERFERENCE POWER LEVELS AT THE PC RECEIVER INPUT (DATA MODE)

The equations used for calculating the  $P_{ino}$  distributions for the various interaction modes are presented in this appendix. Many of the parameters in these equations are stored in the EPF.

### Transmitter Adjacent Signal

The mean  $P_{ino}$  interference power level received in the PC receiver 3-dB bandwidth in the voice mode is the same  $P_{ino}$  interference power levels received in the data mode. For the TAS  $P_{ino}$  interference power levels at the PC receiver input, refer to Table D-1.

### Receiver Adjacent Signal 1

$B_{eff}$  is obtained from the receiver rejection curve found in the EPF receiver record. The curve is symmetric about  $\Delta f = 0$ . The mean  $P_{ino}$  for the receiver adjacent-signal interaction with nonlinear effects is given by Equation D-2.

The RAS1  $P_{ino}$  power levels at the PC receiver front end are shown in Table E-1.

**Table E-1. AIS RAS Interference Power Levels at the PC Receiver Input-Data Mode**

$P_{ino}$ (dBm)	$P_t$ (dBm)	$G_t$ (dBi)	$G_r$ (dBi)	$L_s$ (dB)	$L_p$ (dB)	Data Mode $B_{eff}$ (dB)	Horizontal Antenna Separation (feet)	Delta $f$ (kHz)
-52.1	41	2.1	2.1	1	26.3	70	10	25
-72.1	41	2.1	2.1	1	26.3	90	10	50
-74.3	41	2.1	2.1	1	26.3	92.2	10	75
-92.2	41	2.1	2.1	1	66.4	70	1,000	25
-112.2	41	2.1	2.1	1	66.4	90	1,000	50
-114.4	41	2.1	2.1	1	66.4	92.2	1,000	75
-123.2	41	2.1	2.1	1	97.4	70	10,000	25
-143.2	41	2.1	2.1	1	97.4	90	10,000	50
-145.4	41	2.1	2.1	1	97.4	92.2	10,000	75

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